STATE OF IDAHO
DEPARTMENT OF
ENVIRONMENTAL QUALITY

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Dirk Kempthorne, Governor
C. Stephen Allred, Director

October 22, 2001

Ms. Kathleen Hain, Manager
Environmental Restoration Program
U.S. Department of Energy
Idaho Operations Office
850 Energy Drive
Idaho Falls, Idaho 83401-1563

RE: *Draft ICDF 60 Percent Design Components for Operable Unit 3-13, Group 3*

Dear Ms. Hain:

The Idaho Department of Environmental Quality (IDEQ) has completed its review of the above-referenced document, and provides the enclosed comments. Both general and specific comments are included.

IDEQ received the draft 60 Percent Design on August 31, 2001. As you are aware, we chose to extend the review period pursuant to Section 8.13 of the Federal Facility Agreement/Consent Order (and documented in the September 17, 2001 letter from D. Nygard regarding the extension).

We look forward to working with your staff to address these comments during the upcoming November 5-6 comment resolution meeting. If you have any questions regarding these comments, please contact me at (208) 373-0306.

Sincerely,

Margie English

Margie English
WAG 3 Manager
IDEQ Technical Services Group

ME/jc

cc: Talley Jenkins, USDOE-ID
Wayne Pierre, USEPA Region X
Daryl Koch, DEQ WMRD
Robert Bullock, DEQ WMRD
Mark Clough, DEQ Technical Services Group
Brian English, DEQ Technical Services Group
Mark Jeffers, DEQ Technical Services Group
Pete Johanson, DEQ Technical Services Group
Mike Spomer, DEQ Technical Services Group
Bruce Wicherski, DEQ Technical Services Group
Gerry Winter, DEQ Technical Services Group
Dennis Romankowski, Encore Env., Inc.

Enclosure

1) 60 Percent Design Components, ICDF Master Table of Documents, Draft DOE/ID 10925, Appendix A, ICDF Cell 2 Excavation Sequence, Sheet C-303, 2 of 2.

a) Please provide text and calculations for the runoff volume capacity of the temporary runoff control berm. From an ALARA standpoint, it would be prudent to place this berm directly onto the operations layer. Please consider this approach.

b) Detail 3/C-302 "Cell 2 Excavation/Cell 1 Liner Edge Exposure": The Temporary Runoff Control Berm appears to have dimension arrows for the height of the temporary berm, but has no associated dimension. Please indicate the height of this berm.

c) The leachate riser pipes will be subject to a great deal of stress, especially at the Cell 1: 2 interface. This area, per detail 5 on this Sheet, is a critical point of potential subsidence and deflection of the riser is a concern. Consideration should be given to additional protection of the riser's internal diameter as it relates to the extraction and re-installation of leachate/ liquid pumps. An additional "collar" (concrete culvert section(s)) would aid in dissipating the loading anticipated on these structures.

2) INEEL CERCLA Disposal Facility 60 Percent Design Components, ICDF Master Table of Documents, DOE/ID – 10925, Rev 0, August 2001, Appendix B, Landfill Operations Overview, Section 1.0, Page B-3

Please add a step in this brief outline that addresses recording of the final waste location, as is shown in Figure 1 of Appendix B.

3) Draft 60 Percent Design Components, ICDF Master Table of Documents, DOE/ID 10925, Appendix B, Landfill Operations Overview, Section 1, Page B-3, Item 7

This item should identify the empty vehicle/ container weigh-out process before the truck returns to the CERCLA RA site.

4) Draft 60 Percent Design Components, ICDF Master Table of Documents, DOE/ID 10925, Appendix B, Landfill Operations Overview, Section 1, Page B-3, Item 9a

The compaction of wastes within this landfill after placement will need to have a compaction baseline established by some other "method" than a "number of passes by the waste placement equipment operator". Please reference the appropriate compaction testing that will initially be performed on the wastes and the details of the on-going QC testing program that will be implemented on a given frequency.

5) Draft 60 Percent Design Components, ICDF Master Table of Documents, DOE/ID 10925, Appendix B, Landfill Operations Overview, Figure 1.

Please add text to Box 7 that identifies weigh-out of the truck and container(s) as necessary.

6) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix B, Section 1.1, Pages B-4 through B-5, List of Proposed Steps

As previously discussed in the IDEQ's May 5, 2001 comments on the 30 percent Design (Comment # 157), it will be necessary to sample leachate and other liquid waste streams discharged to the pond to ensure compliance with 40 CFR 264.552 (c) (2) and 40 CFR 264.552 (c) (4).

7) Draft 60 Percent Design Components, ICDF Master Table of Documents, DOE/ID 10925, Appendix B, Landfill Operations Overview, Section 1.1, Page B-4, Second Bullet.

Please correct the typographical error by replacing *"decontaminated"* with *"decontamination"* water.

8) Draft 60 Percent Design Components, Draft ICDF Master Table of Documents, DOE/ID 10925, Appendix B, Landfill Operations Overview, Section 1.1, Page B-4, Item 3.

The profile sheet should not be the only data used to decide whether TSS acceptable at the ICDF complex. Frequently, when wastewaters in storage are profiled, most of the TSS have *"settled"*. When the wastewaters are transferred out of the storage unit (especially from the tank bottom), the TSS levels rise dramatically. Therefore, a sample should obtained at SSSTF to verify the waste profile.

9) Draft 60 Percent Design Components, ICDF Master Table of Documents, DOE/ID 10925, Appendix B, Landfill Operations Overview, Section 1.1, Page B-4, Item 4.

a) Replace *"disposed"* at the beginning of this sentence with " *off-loaded."*

b) The text should provide a more detailed description of the procedures to remove TSS at the decontamination pad, or reference the appropriate section of the SSSTF Remedial Design/Remedial Action Work Plan that contains this information.

10) Draft 60 Percent Design Components, ICDF Master Table of Documents, DOE/ID 10925, Appendix B, Landfill Operations Overview, Section 1.1, Page B-4, Item 5.

The "gravity drain" system discussed here appears to conflict with other descriptions throughout the 60% design document which mention that the fluids would be "pumped" (e.g., DOE/ID 10866, Section 2.3, Page 2-1 and Section 5.6.3, Page 5-5). Please clarify.

11) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, General Comment

As stated in the IDEQ's written comments on the ICDF 30 Percent Remedial Design (Comment 54 (d)), and discussed among the Agencies during the June

18, 2001 Comment Resolution Meeting, it will be necessary to monitor the uppermost perched aquifer to comply with the substantive portions of 40 CFR 264.97.

12) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, Section C-1, Page C-3, Second Paragraph

Note that 40 CFR 264.98 (g) (4) requires that the substantive requirements of Section 40 CFR 264.99 be addressed if there is statistically significant evidence of contamination at the compliance point.

13) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, Section C-1, Page C-3, Fourth Paragraph, Sixth Sentence

The fact that contaminants exist in the SRPA beneath INEEL in several locations refutes the transport model's conclusions that it will take hundreds or thousands of years for contaminants to reach the SRPA beneath the ICDF. There are also other examples in Idaho of contaminants impacting aquifers at much greater depths in fractured basalt aquifers within a 30-year period.

14) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, Section C-1, Page C-3, Fifth Paragraph

As stated above, the USDOE is required to monitor the uppermost perched aquifer to comply with the substantive portions of 40 CFR 264.97. If drain out of the perched aquifer occurs in 12 to 14 years, as predicted, and monitoring does not show a perched water influence from the Big Lost River when there is significant flow in the river, the Agencies will modify the detection monitoring strategy accordingly.

15) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, Section C-1, Page C-4, First Paragraph

As explained in the IDEQ's May 25, 2001 comments on the 30 Percent Design (Comments 54 a, b, and c), the proposed SRPA monitoring wells are inadequate for detection monitoring at the ICDF complex.

16) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, Section C-5 Page C-5, First Paragraph, First Sentence

As stated above, and in the IDEQ's May 25, 2001 comments on the 30 percent Remedial Design (Comment 54 d), the IDEQ does not consider the SRPA to be the uppermost aquifer. 40 CFR 264.95 clearly defines the point of compliance as the vertical surface located at the hydraulically down gradient limit of the waste management area which extends to the uppermost aquifer. The waste management area is the horizontal plane of the area on which waste will be placed.

17) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, Section C-6 Page C-6, Last Sentence

The paragraph states "*Therefore, the determination that a release from the ICDF will not be made solely on SRPA monitoring data alone, and must be confirmed by the vadose zone monitoring data.*" It is not appropriate to pre-judge the value of the data from the SRPA and conclude that it has to be confirmed by data from the vadose zone. Obviously, data from the vadose zone is desirable to confirm data from the SRPA but vadose zone monitoring has a limited volumetric representation whereas aquifer samples benefit from the homogenizing influence of the ground water in the saturated zone. The impact of this statement is exacerbated by the very limited effort described for vadose zone monitoring in the 60% design. This statement requires qualification to note that it is desirable to confirm SRPA sample results with vadose zone monitoring results but it is not mandatory.

18) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, Section C-8 Page C-7, First Paragraph

a) The proposed analyte list is inadequate. At a minimum, the following analytical parameters must be included: VOCs (method 8260), SVOCs (method 8270), PCBs, and a full suite of heavy metals (e.g., methods 6010, 7470, 7760) unless wastes that may contain these contaminants are prohibited from disposal at the ICDF complex.

b) It should be noted in the schedule that USDOE would be obligated to monitor this facility for as long as wastes remain entombed within the ICDF. With a design life of 1,000 years, the design of the facility is a small fraction of one half-life of the two key contaminants of concern that will be disposed. I-129 and Tc-99 have half-lives of 15,700,000 years and 213,000 years respectively. Groundwater monitoring is a very long-term commitment by USDOE for this facility.

19) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, ICDF Groundwater Monitoring Data Quality Objectives, Section C-8 Page C-7, Second Paragraph

Please see Comment #15 regarding the adequacy of the proposed SRPA monitoring wells for detection monitoring at the ICDF complex.

The following wells are designated as SRPA monitoring wells for the ICDF; USGS-42, USGS-57, USGS-112, and USGS-113.

Well Designation	Distance to Edge of ICDF (ft)	Distance from W.T. to top of Screen or Open Interval (ft)*	Individual or Composite Length of Screen or Open Interval (ft)
USGS-42	1,000+/-	3 below W.T.	225

USGS-57	100-200+/-	27 below W.T.	255
USGS-112	3,000+/-	20 over W.T.	134
USGS-113	3,000+/-	5 over W.T.	119

*Assumes a constant depth to the water table (W.T.) of 450 ft. beneath the ICDF (page C-7, paragraph 2) even though some wells are distant from the ICDF.

Well USGS-42 is too distant from the ICDF to appropriately represent ground water that will flow beneath the ICDF as an up-gradient indicator of contamination. The open interval for this well is too large to accurately sample ground water near the water table where any contamination would be detected if contamination leaves the ICDF. Samples are too prone to dilution with this large open interval A minimum of one new monitoring well in the Snake River Plain Aquifer is required to serve as an upgradient well to meet the requirements of 40 CFR 264.97 (a). This well should be completed with approximately 5 ft. of screen above the water table and 20-30 ft. of screen below the water table.

Well USGS-57 is completed too deep below the water table and the open interval is too large to obtain representative samples. At least one and preferably two new wells are needed immediately down-gradient of the ICDF to detect ground water contamination that may originate from the ICDF. Again the open intervals or screens should be completed approximately 5 ft. above the water table and extend 20-30 below the water table.

Wells USGS-112 and -113 appear to be completed across the water table but these wells are too distant from the ICDF to be useful for detecting contamination that may emanate from the ICDF. Also, the wells have too large an open interval making them subject to dilution of samples. At least two new wells are needed within approximately 500 ft. of the ICDF to obtain appropriate samples of ground water in accordance with 40 CFR 264.97(a).

20) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, Attachment 1, Section 3, Page C-1-3

The referenced text states *"In general, the near-surface geology beneath the landfill can be characterized by predominantly alluvial-deposited sand and gravel to a depth of 32 to 43 ft. Underlying the high-energy deposits of sand and gravel is a low energy "old alluvium" deposit of clay, which ranges in depth from 2 to 7 ft and mantles consolidated basalt bedrock. Significant perched saturated lenses have been identified at 110 to 150 ft below ground surface (bgs), with the major water-bearing saturated zone beginning approximately 450 ft bgs."* The statement regarding the high-energy deposits points out the uncertainties associated with the location of the ICDF and its proximity to the estimated boundary of the 100-year flood plain. Therefore, care must be exercised to ensure that adequate monitoring is implemented to detect any failure of the ICDF. The second statement regarding the occurrence of perched zones emphasizes the need for determining the presence/absence of perched aquifers beneath the ICDF and for monitoring these potential perched aquifers over the long term because of variations in flow in the Big Lost River. Perched aquifer wells are needed on at least three sides of the ICDF to establish groundwater flow directions and establish a ground water monitoring network. This ground water monitoring network may need to be revised in the future based on determination of ground water flow directions.

21) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, Attachment 1, Section 4, Page C-1-4, First Paragraph under Section Heading, Third Sentence

The proposed vadose zone monitoring system, located beneath only a very small portion of the landfill, cannot meet the stated objective *"to conclusively identify the source of any detected problems."*

22) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, Attachment 1, Section 4.2, Page C-1-6

The statement regarding use of *"simple conductivity"* does not seem to reconcile with statements made in Sections 4.3 and 5 regarding the use of indicator parameters. Section 4.3 refers to the use of *"common indicator parameters"* such as *"electrical conductivity, chloride, fluoride, bromide, nitrate and iodine."* Section 5

refers to the use of I-129 and tritium as potential indicator parameters. It is unclear what indicator parameters the USDOE is proposing to use.

Periodic sampling and analysis will be needed of the landfill leachate, pore water, perched water, and SRPA water to determine if a correlation exists between the quality of these waters and specific conductivity or any other indicator parameter for each water type. Also a good correlation must be demonstrated should an indicator parameter be used for comparison of different waters. This relationship between water quality and each water type will have to be confirmed periodically with sampling and comprehensive analyses to verify that the relationship is not changing over time as waste forms and types change.

23) Draft 60 Percent Design, Master Table of Documents, DOE-ID-10925, Appendix C, Attachment 1, Section 5, Page C-1-8

The referenced text states *"The proposed vadose zone monitoring plan includes the use of a tertiary LDS under the LCRS sump. Although the liner design is very conservative and already includes an integral LDS, this partial tertiary LDS would provide immediate detection of leaks through the liner system in the highest leak risk area. No soil moisture monitoring or soil pore sampling is proposed, because the results are likely to be subject to error from outside influence such as the river and percolation pond recharge perching at the old alluvium and bedrock interfaces."* This limited approach is not acceptable. The vadose zone monitoring plan must include the installation and monitoring of both perched aquifer wells and the unsaturated zone beneath the ICDF. The statement quoted from the plan notes the potential influence of the Big Lost River and the percolation ponds but the plan ignores their impact. Wells are needed to determine the presence/absence of perched aquifers and to monitor the water quality of any perched aquifer over time. Additional vadose zone monitoring is needed to provide better spatial coverage beneath the ICDF since the proposal is to only monitor beneath the sump collection system which constitutes a small percentage of the overall area of the ICDF. As stated above, this should include perched water monitoring. In addition, suction lysimeters are needed in a statistically appropriate scheme to provide detection monitoring beneath the ICDF.

24) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, General Comments

a) The failure to take cumulative effects of COPC into account is a major source of uncertainty, leading to the likely underestimation of risk. It is not possible to evaluate the potential interactions of a large number of contaminants, but it must be acknowledged that cumulative impacts are likely. Even exposure to lower levels of the COPC that were screened is likely to tax metabolic detoxification pathways such that organisms will be somewhat compromised and less able to tolerate the total burden of chemicals to which they will be exposed.

b) Many radionuclides were screened out of the assessment. The remaining nuclides are assessed individually. It would appear that the most important consideration in the risk assessment is the total internal and external dose received by receptors from exposure to all radionuclides. If this cannot be determined, then a significant area of uncertainty and likely risk underestimation must be acknowledged in the document.

c) The evaporation pond is likely to be used as a significant resource by migratory birds, including waterfowl. Receptors such as ducks would be expected to have considerable exposure to COPC in water and sediment. The risk assessment has not adequately characterized risk to these receptors.

25) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 1.1.2.4, Page 21, Paragraph 1, First Sentence

It is stated that Table 5 lists fauna potentially present near or within the assessment area. Table 5 lists species of special concern, however. Please clarify.

26) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 1.1.3, Page 26, Paragraph 1, Second Sentence

a) Surface soil pathways will not be evaluated because surface soil will be

buried beneath two feet of gravel. Please provide information regarding the assumed time interval between placement of contaminated soil in the landfill and covering with gravel.

b) Also, please explain the statement that the surface water pathway will not be analyzed. The meaning of the statement is not clear, as water ingestion by ecological receptors is included in the analysis.

27) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 2.1.2, Page 37, Paragraph 3, Second Sentence

The reference to Equation 6 should be to Equation 5. Please correct.

28) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 2.3.6, Page 44, Paragraph 3

This paragraph is essentially a duplicate of the paragraph comprising Section 2.4.4, in which the uncertainty associated with PUFs and BAFs is discussed. This uncertainty discussion does not need to appear in both sections.

29) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 3, Page 50, Paragraph 3, First Sentence

The term COPC has been used consistently in INEEL risk assessments to describe both radiological and nonradiological contaminants. In ecological risk assessment, the term ROPC has frequently been used to describe receptors of potential concern. For these reasons, it would be less confusing to list the two different classes of contaminants as radiological and nonradiological COPC.

30) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 3.1.1, Page 50, Paragraph 3, First Sentence

The term "BDAC" should be defined. It does not appear to be defined in this section or in the acronym list.

31) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 3.1.1.4, Page 54, Paragraph 1

The IDEQ is not familiar with the proposed DOE guidance *"A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota."* The text indicates that it "it is approved by EH-4 for interim use by DOE program and field elements in evaluating doses to biota." However, the proposed use of this approach for the ICDF remedial action SLERA requires review and concurrence of the IDEQ and USEPA. Therefore, please provide a copy of the referenced draft document for our review. Until the methodology is reviewed, it will not be possible for the IDEQ to approve its application in this SLERA.

32) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 3.1.1.4, Page 54, Table 14

Activity concentrations of radionuclides in INEEL risk assessments have generally been measured and presented in units of picocuries. This table has units of both becquerels and picocuries. It is recommended that one system be used consistently in the document; at the least the two types of units should not be mixed in the same table. If SI units such as becquerels are required for some reason, then the value in the other units should be presented in parentheses.

33) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 4.4, Page 73, Paragraph 5, Third Sentence

It is stated that radionuclide TRVs are based on effects on populations, and are thus less conservative than nonradionuclide TRVs, which are based on effects on individuals. This is particularly true for species of special concern, in which the focus is risk at the individual level. It is likely, then , that the use of radionuclide TRVs will result in underestimation of risk to T/E species and other species of special concern.

34) Draft 60 Percent Design, EDF-ER-311, Screening Level Ecological Risk Assessment, Section 4.4, Page 74, Table 18

This table should acknowledge the unavailability of toxicity information for a

large number of COPC as a significant area of uncertainty in the risk assessment

35) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Landfill, DOE-ID-10865, Section 1, Figure 1-1, Page 1-2

a) The ICDF is incorrectly located in this figure (i.e., portrayed to be northeast of the INTEC). Please correct.

b) A legend, or at least an arrow, should be used to identify the dashed area as the AOC.

c) It is unclear why the permanent stockpile is depicted as the AOC in the enlargement. Please clarify the intent.

36) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Landfill, DOE-ID-10865, Section 4.1.1, Table 4-1, Page 4-1

The IDEQ cannot concur with the statements in the Summary of Results column for the Liner/Leachate Compatibility Study. These statements indicate that *"organic constituents would have to be present at concentrations several orders of magnitude higher than the Design Basis Inventory organic constituents before they could be considered a problem for liner compatibility."* This is inconsistent with the IDEQ's review of information included in the Liner/Leachate Compatibility Study provided in the 30 percent Remedial Design. As stated in the IDEQ's May 25, 2001 comments on the 30 percent Design (Comment 111 a), all organic contaminants were screened out of the Liner/Leachate Compatibility Study. There were no limits of organic contaminants identified that could be accepted into the landfill without adverse effects on the liner system. The USDOE's response to the IDEQ's comments states that *"All constituents identified in future versions of the WAC will be included in this EDF and specific WAC limitations will be developed for these constituents."* The IDEQ cannot concur with information that has not yet been provided for review.

37) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Landfill, DOE-ID-10865, Section 4.1.3, Page 4-2, First Paragraph under Section Heading

Please see Comment #36 regarding conclusions drawn from the Liner/Leachate Compatibility Study (DOE/ID EDF-ER-278).

38) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Landfill, DOE-ID-10865, Section 4.1.3, Page 4-2, Second Paragraph under Section Heading

As stated in the IDEQ's May 25, 2001 comments on the 30 percent Design (Comment # 156), the criteria that will be used by the ICDF Management on a case-by-case basis to determine chemical equivalency through a paper study must be identified in the design documents. Note that these criteria must receive Agency concurrence. If sufficient detail regarding these cannot be put into the Group 3 RD/RA documents because site specific waste forms are unknown at this time, then either EPA Method 9090 will be required to demonstrate compatibility or Agency concurrence on the paper study must be sought on a case-by-case basis when each situation arises.

39) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Landfill, DOE-ID-10865, Section 4.1.4, Page 4-2

The text makes reference to a document, which has not yet been submitted, for Agency review. No concurrence regarding information to be presented in this document can be given at this time.

40) Draft 60 Percent Design Components, Waste Acceptance Criteria for ICDF Landfill, Section 4.2.1, Page 4-5, Table 4-2

The $1X10^{-4}$ risk based concentration for I-129 appears to be in error. The out-dated risk based tables created by Jeff Fromm (IDEQ, January 3, 1996) show a $1X10^{-6}$ risk concentration of $2.6X10^{-1}$ pCi/l which equates to a $1X10^{-4}$ risk concentration of $2.6X10^{1}$ pCi/l. The $1X10^{-4}$ risk based concentration presented in this table is 2.67 pCi/l which is an order of magnitude smaller. Small changes are expected in new risk based concentrations following the new EPA

approach. The half-life for I-129 should not be a factor in this table so the values should match closer than is evident.

Tc-99 risk based concentrations in this table, when compared to Fromm (January 3, 1996), appear to be off by 2 orders of magnitude although similar in value when the order of magnitude is ignored. The half-life for Tc-99 should not be a significant factor in this table so the values should match closer than is evident.

41) Draft 60 Percent Design, DOE/ID 10865, Waste Acceptance Criteria for ICDF Landfill, Section 4.2.1, Page 4-7, Figure 4-1.

A *"yes"* is missing under decision/evaluation #3.

42) Draft ICDF 60 Percent Design, Waste Acceptance Criteria for the ICDF Landfill, DOE/ID-10865, Physical and Chemical Criteria, Land Disposal Restrictions, Hazardous Waste, Section 5.2.2.1, Page 5-3, 1st Paragraph, Sixth Sentence

The 6th sentence appears to contain an incorrect acronym of "UST" ("...the constituent must be present below the applicable LDR and UST levels.."). Please clarify if this refers to UTS (Universal Treatment Standard).

43) Draft ICDF 60 Percent Design, Waste Acceptance Criteria for the ICDF Landfill, DOE/ID-10865, Physical and Chemical Criteria, Land Disposal Restrictions, Hazardous Waste, Section 5.2.2.1, Page 5-4, Table 5-2

a) Please clarify how the Maximum Design Recharge Rate was determined.

b) Also, clarify what form of cyanide (total, weak and dissociable, etc.) is applicable for the 8.2E-02 mg/kg level in waste soil.

44) Draft 60 Percent Design, DOE/ID 10865, Waste Acceptance Criteria for ICDF Landfill, Section 5.2.3, Page 5-9.

Since the WAG-3 Remedial Action is responsible for ensuring that the stabilized waste form meets the 50 psi standard and does not compromise the long term effectiveness of the cover, the ICDF management should identify and provide guidelines to the "generator" regarding the selection and use of stabilization agents.

45) Draft 60 Percent Design, DOE/ID 10865, Waste Acceptance Criteria for ICDF Landfill, Section 5.2.7, Page 5-10, Table 5-4.

Steel boxes: The text states that the steel boxes are assumed to be completely filled and, therefore, uncompressible. Very few cleanup projects have just enough waste to fill every box to the top, and/or box contents may settle significantly during transport. This is a concern because the proposed waste verification step at receipt does not include opening containers. Yet, the very next sentence indicates boxes with greater than 5% void space will not be accepted. Please explain, in the text, how this criterion can be met without visual verification. It is the responsibility of the ICDF management to verify these aspects of the waste profile.

46) Draft 60 Percent Design, DOE/ID 10865, Waste Acceptance Criteria for ICDF Landfill, Section 5.4.6, Page 5-22, Third and Fourth Bullets.

The IDEQ agrees that these two criteria are important to ensure that the cover is not compromised. However, the procedures and activities outlined within this WAC (and the related ICDF complex and SSSTF WACs) do not ensure that these criteria will be met. Please see Comment #45 .

47) Draft ICDF 60 Percent Design, Waste Acceptance Criteria for the ICDF Landfill, DOE/ID-10865, Radiological Criteria, Section 5.3, Page 5-11 through 5-20, Table 5-5

Presentation of the restrictions on the radionuclide activity that can be placed in the ICDF landfill is confusing and requires clarification. The IDEQ received the complete 60 percent submittal and began our review on August

31, 2001. On September 4, 2001 the IDEQ received a "*revised ICDF Landfill Waste Acceptance Criteria*" from Mark Nielsen of CH2MHILL. The transmittal memorandum indicates that CH2M HILL found "mistakes in the ICDF WAC for the Landfill version" the Agencies received on August 31, and requests that we "replace that version with the new version attached to this letter." The table 5-5 provided in the September 4 version is formatted differently than the table provided in the August 31 original submittal. The September 4 version of Table 5-5 is confusing in that little or no explanation of column calculations is provided, and units are not consistent. In addition, the utility of including short lived species such as Ba-136m with a half-life of 9.77 E-9 years (0.3 seconds) is questionable. The IDEQ asked for clarification of this table on a September 24 conference call. In response, Mark Nielsen stated that the September 4 version of the table contains apportioning errors, which would result in some changes to the calculated RBC and RAO values; he indicated that some values would change by roughly two orders of magnitude. To correct the errors in this table and to provide additional explanation of calculations, USDOE transmitted another version of the table electronically on September 27. This table was expanded significantly from the September 4 version (i.e., the September 27 version consists of over 40 columns versus 15 columns in the September 4 version). The transmittal note indicates that the September 27 version is intended to be part of the ICDF 90 percent Design submittal, and that USDOE only expects this review cycle to include comments on the portion of the spreadsheet that was included with the 60 percent submittal.

Correlation between the September 4 and September 27 versions of the table is very difficult because some of the column titles have changed. The IDEQ has used the "cross-walk" guide included in the transmittal e-mail for the September 27 version to attempt to correlate this table with the September 4 version. However, it is not readily apparent exactly which values changed between the September 4 and September 27 versions. Further explanation of these changes is needed. Additionally, the derivation methodology of some of the columns remains unclear, despite the explanations provided in the September 27 file entitled "*Derivation of RAO-based Concentration . . .*" Finally, the IDEQ expected that the table would include a column presenting an acceptable Curie concentration/contaminant. However, this derivation does not appear to be provided. During comment resolution, the Agencies need to

carefully discuss and reach consensus on the contents/derivation methodologies of those portions of Table 5-5 that are included, or need to be included, in the remedial design.

48) Draft 60 Percent Design, Waste Acceptance Criteria for the ICDF Landfill, DOE/ID-10865, Radiological Calculation Methods, Appendix B, Table B-1, Pages B-3 through B-7

The text should provide explanation of the derivation of the *"Dose Equivalent curie Correction Factor."* It is obviously normalized to PU-239/240, but further explanation on how this was done is necessary.

49) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, List of Acronyms, pages ix through x

Please add RAO and RBC to the list.

50) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Nomenclature, pages xi through xiii

The IDEQ recommends that *"PCB waste"* be defined because the text, as written, is confusing. The ICDF landfill will accept PCB waste, and the landfill leachate will be discharged to the evaporation pond. However, Section 5.1.2 of this WAC indicates that PCB waste is prohibited from the pond. The document needs to provide cl0arification on this item.

51) Draft 60 Percent Design Component Submittal, DOE/ID 10866, Waste Acceptance Criteria for ICDF Evaporation Pond, Section 1.2.1, Page 1-3, First Bullet, Last Sentence.

This sentence is not accurate. Treatment for TSS will be provided to these wastewaters prior to being disposed in the evaporation pond. Please modify the sentence.

52) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Section 1.2.1, Page 1-3, Second Bullet, Last Sentence

Please identify where the *"design basis inventory"* is located in the document for the evaporation pond. This was not included in ICDF Design Inventory presented in the 30 Percent Design (EDF-ER-264). Without having reviewed this information, we cannot concur with the assertion that all of the waste in the current design basis inventory can be accepted into the ICDF evaporation pond without treatment .

53) Draft 60 Percent Design, DOE/ID 10866, Waste Acceptance Criteria for ICDF Evaporation Pond, Section 1.2.1, Page 1-3, Last Bullet.

Well development water should be treated to reduce the TSS prior to discharge to the evaporation pond.

54) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Section 1.4.2, Page 1-5, Last Bullet

Please see Comment #36 regarding conclusions drawn from the Liner/Leachate Compatibility Study (DOE/ID EDF-ER-278).

55) Draft 60 Percent Design, DOE/ID 10866, Waste Acceptance Criteria for ICDF Evaporation Pond, Section 1.5, Page 1-6, Additional Issue to be Addressed.

Vehicles (tankers, flatbeds with portable tanks, etc.) will require flushing/rinsing of aqueous or silty residues. Please indicate the responsible entity for this procedure. Also, the text should describe where and how this will be accomplished.

56) Draft 60 Percent Design, DOE/ID 10866, Waste Acceptance Criteria for ICDF Evaporation Pond, Section 1.5.1, Page 1-6, List of Bullets.

Please add an additional bullet indicating management of all off-loading events to the evaporation pond for aqueous wastes that are generated outside of the ICDF Complex.

57) Draft 60 Percent Design, Waste Acceptance Criteria for the ICDF Evaporation Pond, DOE/ID-10866, Waste Profile Process, Section 2., Page 2-1

Please clarify if the Waste Profile form for the ICDF landfill is the same Profile form used for the ICDF Complex, and provide a copy of this form as an attachment.

58) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Section 2.2, Page 2-1, Table 2-1

a) Please see Comment #64 for additional restrictions on the types of aqueous wastes accepted for discharge to the evaporation ponds.

b) CERCLA-generated well purge/development water: These wastes must also meet the TSS physical criteria.

59) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Section 3.5.1, Page 3-3, Last Sentence

As stated in the IDEQ May 25, 2001 comments on the 30 percent Design (Comment # 157), some sampling of leachate and other waste streams that will be sent to the pond is necessary to ensure compliance with 40 CFR 264.552 (c) (2) and 40 CFR 264.552 (c) (4). The text states that "*the ICDF management may elect to track the concentrations of key indicator parameters contained in the leachate, as measured in the evaporation pond.* This proposed approach is insufficient. First, the need to sample the waste streams that discharge to the evaporation pond is ARAR-driven and is not at the discretion of the ICDF management. Secondly, the waste streams must be sampled prior to discharge

into the pond in order to determine whether use of the pond will remain protective, not after the waste has been diluted in the pond. Thirdly, as stated in the previous comment, the Agencies need to determine the required analyte list and sampling frequencies to address these ARARs; at this time, the IDEQ does not concur that sampling will include only *"key indicator parameters."*

60) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Section 3.5.2, Page 3-3, Second Sentence

The logic behind the referenced sentence is unclear. Regarding non-leachate aqueous wastes, the text states that, *"individual discharges of aqueous waste to the ICDF evaporation pond must be accompanied by a waste profile sheet, but separate analytical data are not required for each discharge of water from the same source because the waste generating the water is the same as the waste generating the landfill leachate."* The IDEQ agrees that if analytical data exists for a particular waste stream, and if the factors that could affect the water quality have not changed, then separate analytical data would not be required for each discharge. For example, in the case of purge water from a given well, if there have been no changes in sample collection techniques such as depth of pump or flow rate, then previous analytical data may be sufficient to characterize the waste stream. However, the IDEQ disagrees with the last portion of the referenced statement indicating that the waste generating the water is the same as the waste generating the landfill leachate. This logic is unclear, and not necessarily valid. The source of non-leachate liquid wastes discharged to the evaporation pond may or may not derive from a source material disposed in the ICDF landfill. This is particularly true with respect to purge/development water. Please modify the text accordingly.

61) Draft 60 Percent Design, DOE/ID 10866, Waste Acceptance Criteria for ICDF Evaporation Pond, Section 3.12.2, Page 3-4.

Please also include the aqueous wastewaters currently in storage within the SSA facility.

62) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Section 4.1.3, Page 4-2, First Paragraph

Please see Comment #36 regarding conclusions drawn from the Liner/Leachate Compatibility Study (DOE/ID EDF-ER-278) presented in the 30 percent Design. This paragraph also refers to liner compatibility concentrations for organics that have not yet been provided to the agencies. The IDEQ cannot concur with information that has not yet been provided for review.

63) Draft 60 Percent Design, Waste Acceptance Criteria for the ICDF Evaporation Pond, DOE/ID-10866, The Corrective Action Management Unit, Section 4.1.4.1, Page 4-2

Please discuss how and when the CAMU Closure and Post-Closure plans for the evaporation pond will be developed per 40 CFR 264.552 (e) (4).

64) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Section 4.1.4.1, Page 4-2, Second Paragraph under Section Heading, Second Sentence

We disagree with the assertion that any "*CERCLA-generated aqueous waste from within the INEEL that meets the evaporation pond WAC can be accepted into the evaporation pond without further treatment.*" As stated in paragraph 1, the ROD specified that the evaporation pond will be designed and constructed to treat ICDF leachate and other aqueous wastes generated during operations of the ICDF complex. Decontamination water is an example of an aqueous waste that could be generated during operations of the ICDF complex, and could therefore go to the evaporation pond. The ROD also identified purge and pumping test waters from Group 5 as candidates for discharge to the evaporation pond. However, CERCLA aqueous wastes that are not generated as part of the operation of the ICDF complex are not eligible for discharge to the evaporation pond. This includes as-generated wastes from process waste tanks and/or wastes generated as a result of implementing remedial actions on process waste tanks. These wastes are not eligible for discharge to the evaporation ponds, regardless of whether their contaminant concentrations meet the evaporation pond WAC. Additionally, these other CERCLA aqueous

wastes would likely meet the ICDF WAC following treatment and, once treated, would not occupy a significant volume of space in the landfill.

65) Draft 60 Percent Design, Waste Acceptance Criteria for ICDF Evaporation Pond, DOE-ID-10866, Section 4.2, Page 4-4, First Paragraph under Section Heading

As discussed on the September 24, 2001 tri-agency conference call regarding the risk assessment, the site visitor who spends one day per year at the ICDF fence line may not be the most conservative public exposure. For example, a resident of Atomic City who commutes to Arco daily may be subject to a larger exposure over time. Also, consideration should be given to any delivery personnel and/or volunteers at EBR-1 who may receive a larger dose than the proposed scenario.

66) Draft 60 Percent Design, EDF-279, Hydrologic Modeling of Final Cover, Section 2, Page 2-1

Based on the hydrologic model geometry presented in Figure 2-1, the IDEQ does not agree with the location of observation points chosen for subsequent analysis in the report. In particular, the location of points D and F seem inappropriate. Based on our current understanding of the diversion capability of sloped, capillary barriers the most likely point at which there would be significant breakthrough would be downslope of the crest of the cover rather than at the midpoint. At such downslope locations, infiltration is augmented by runoff on the cover. Likewise maximum flux would not occur at point F but somewhere downslope. A 2-dimensional analysis is needed as described in Comment #68.

67) ICDF 60 Percent Design, EDF-ER-279, Hydrologic Modeling of Final Cover, Section 3.1, Page 3-1, Figure 3-1 INEEL Annual Precipitation

The ordinate axis has units of "inches" in this figure. It is assumed that these units should be "millimeters" to match the text discussion. Please clarify.

68) Draft 60 Percent Design, EDF-ER-279, Hydrologic Modeling of Final Cover, Page 4-2, Section 4.2, Upper Cover Section Breakthrough

The method of analysis used to estimate breakthrough in the upper cover section is not truly a 2-dimensional analysis. The use of the SoilCover model, a 1-dimensional model, does not take into account the sloping nature of the capillary barrier and, as a consequence, the true flux (or its location) which would occur upon breakthrough. The average annual flux shown in Table 4-1 and assigned to point D in Figure 2-1 is not conservative for any of the precipitation scenarios.

The 2-dimensional analysis (model) should be combined with an analytical analysis for verification. Such an examination is described in Selker, et al. *Vadose Zone Processes*, Chapter 3. Please provide this analytical solution.

The IDEQ used the approach described in Selker, et al. ***Vadose Zone Processes***, Chapter 3, noted above, to estimate the vertical flux that would be required to cause breakthrough from the silty loam soil at a distance of 100 meters from the axis of the cover. A value of 100 meters was selected that is less than the side slope length of 122 meters. The internal slope of the capillary barrier is assumed to be 1.718°, the same as the final cover slope. Saturated hydraulic conductivity is assumed to be $5X10^{-4}$ cm/sec. The air entry pressure is assumed equal to "a" for the silty loam soil (page C-32) which is 15.84 kPa or 0.1615 m – head of water.

$$q = |h_{ae}| (k_{s1})(\tan\Phi)/L$$

$$q = 0.76 \text{ cm/yr} = 7.6 \text{ mm/yr}$$

This calculation supports the model prediction that breakthrough would occur at greater than three times recorded precipitation. We request that a similar calculation be performed by DOE and included in the 90% design. The question remains as to whether the predictions are conservative for the long term, both the 1,000 year design life of the facility and with respect to the half lives of contaminants that will be placed in the facility.

69) Draft 60 Percent Design, EDF-ER-279, Hydrologic Modeling of Final Cover, Section 4.2, Page 4-2, Paragraph 2

This paragraph states that "The SoilCover™ 2000 computer program approximates run-off using a method that includes a small inherent error." Provide a quantified limit on this error.

70) Draft 60 Percent Design, EDF-ER-279, Hydrologic Modeling of Final Cover, Page 4-3, Section 4.3, Infiltration Due to Biological Intrusion

The analysis of infiltration due to biological intrusion is confusing. How is it determined that the area drained by the burrow is 10 times the diameter of the burrow? Please show the derivation of the equation given for calculating this area and, if possible, relate this to some schematic drawing of the relationship that is being calculated.

71) Draft 60 Percent Design, EDF-ER-279, Hydrologic Modeling of Final Cover, Page 4-3, Section 4.3, Infiltration Due to Biological Intrusion

The analysis of lateral drainage in this section only addresses the capacity of the lateral drainage layer to conduct water under saturated conditions. It does not take into account and address movement and infiltration of water through this layer and into the underlying material (potentially a degraded CCL) under unsaturated conditions, which may be the most likely scenario.

72) Draft 60 Percent Design, EDF-ER-279, Hydrologic Modeling of Final Cover, Page 4-5, Section 4.5, Percolation at Base of Cover

Research on the correlation of percolation to infiltration reported in one paper, not provided to the IDEQ and based on hydrologic simulations using the HELP model, are used to reduce the percolation through the cover essentially by a factor of 5X. The application of a screening model analysis to numerical simulations involving extremely small fluxes is not reasonable. The IDEQ cannot accept this significant reduction on this basis and without additional documentation. As in other comments above, the IDEQ believes that 2-dimensional modeling of the complete geometry of the cover system should be completed to more accurately represent the movement of water through the

system. This is preferred to relying on a series of less than adequate evaluations to address the multi-dimensional aspects of the cover.

73) Draft 60 Percent Design, EDF-279, Hydrologic Modeling of Final Cover, Section 4.5, Page 4-2, Paragraph 2

The use of non-site-specific HELP model simulations to determine that 20% of the available water will infiltrate the CCL is less desirable than doing site specific calculations or modeling to predict the amount of infiltration that could occur. Please replace this section with site specific analyses rather than the approach presented.

74) Draft 60 Percent Design, EDF-279, Hydrologic Modeling of Final Cover, EDF-ER-279, Section 5.2, Page 5-2, Paragraph 1

a) Please clarify the last sentence which states "*The resulting infiltration at Point D is 0.17 mm/yr, which is less than the actual infiltration 0.49 mm/yr determined in Section 4.2.*" Neither value appears in Section 4.2 so it is not clear what is being stated.

b) In addition, this is a comparison of modeled values and none of the values should be characterized as "*actual infiltration*" as used in the document. This section requires modification to clearly state intent.

75) Draft 60 Percent Design, EDF-279, Hydrologic Modeling of Final Cover, EDF-ER-279, Section 6, Page 6-2, Paragraph 1

a) Please see Comment #74 regarding the sixth sentence.

b) The paragraph also states "*Precipitation of four times the average annual precipitation saturates the water storage layer rendering it ineffective for reducing infiltration.*" Appendix E, Figure E-2, on page E-3 illustrates the resulting infiltration rates through the silt loam layer with increasing precipitation. Infiltration is depicted as increasing linearly between three and four times the "*1975 recorded precipitation*". In other words, infiltration is predicted to increase when precipitation exceeds three times the 1975 recorded value. This was a simplistic sensitivity

approach toward assessing the potential impact of climate changes in that only the amount of precipitation was changed and other climatic factors were not changed. The margin of safety associated with this design is not conservative since other appropriate climatic changes are not considered that would be anticipated with a higher precipitation environment such as cooler temperatures and less solar input. The quoted phrase should be re-stated to note the cover becomes ineffective at adequately reducing infiltration to about three times the average annual precipitation using even a simplistic precipitation scenario.

76) Draft 60 Percent Design, EDF-279, Hydrologic Modeling of Final Cover, Appendix E, Sensitivity Analysis, Section 2., Precipitation Sensitivity

The results of the precipitation sensitivity analysis, showing a decrease in infiltration from the 2X to the 3X simulations due to increased transpiration, illustrate the impact of factors other than precipitation on resultant infiltration. The intent of the sensitivity analysis from the perspective of the IDEQ is to evaluate long-term climate change scenarios. The omission of other climatic variables that could likely accompany increased precipitation in a future climate change scenario and thereby influence vegetative growth and the net infiltration of precipitation limits the utility of the analysis.

77) Draft 60 Percent Design, Fate and Transport Modeling Results and Summary Report, EDF/ER-275, General Comments

a) The modeling efforts predict the need to limit infiltration to 0.0001 m/yr to avoid contaminating the aquifer to unacceptable levels. This infiltration rate must be maintained beyond the life of the ICDF because of the long half-lives of the key radionuclides of concern.

It is a serious concern that an infiltration rate of 0.0001 m/yr is used to justify acceptable waste concentrations for the ICDF. This low infiltration rate requires acceptance of some key assumptions given the predicted peak arrival time of the I-129 in the aquifer is in excess of 10,000 years. It requires acceptance of the ability of the cap to reduce infiltration to 0.0001 m/yr, acceptance that the cap can continue to reduce infiltration to 0.0001 m/yr for thousands of years, and

acceptance that the precipitation rate will not increase over three times the 1975 recorded precipitation. The sensitivity runs indicate failure of the cover when precipitation exceeds three times the 1975 recorded precipitation. It is not unreasonable to assume that precipitation could increase significantly in the intervening years and if the cap has degraded, allow a much higher infiltration rate through the ICDF than predicted with a fully functional cap.

The key radionuclides of concern that are most likely to pose a future risk in the aquifer are I-129 and Tc-99. I-129 has a half life of 15,700,000 years and Tc-99 has a half life of 213,000 years. The design life of the ICDF is 1,000 years, which are two orders of magnitude less than the half life for Tc-99 and four orders of magnitude less than the half life for I-129. The time frames in question are disproportionate by orders of magnitude. The IDEQ believes contaminants with half lives that prohibit the reduction of these contaminants to acceptable levels by natural decay within the 1,000 year design life should be severely limited or excluded from disposal in the ICDF.

b) The methodology used to develop the WAC for the COCs involves the modeling of individual contaminants, uses dilute starting concentrations in the repository, and assumes linear, and essentially unlimited, adsorption of all contaminants. These assumptions may not be valid or realistic under the conditions for which the soils will be placed in the repository.

Impacts at the groundwater compliance point from these dilute concentrations of contaminants placed in the repository are linearly scaled upward to develop the acceptance limits. The sorption capacity of the vadose zone below the waste with respect to the total, cumulative mass of all the contaminants placed in the repository is not addressed.

An appropriate simulation that should be performed would be to place the estimated acceptance limits of all contaminants (or at least all significant contaminants) into the repository and run the same simulation as was done for the individual groups.

78) Draft 60% Design, Fate and Transport Modeling Results and Summary Report, EDF/ER-275, Section 1, Page 1-2, Paragraph 2, Third Sentence

The paragraph references a letter from Talley Jenkins (2001) to Martin Doornbos that states the values to be used for the distribution coefficients (K_d) for contaminants of concern. Please provide a copy of this letter to the IDEQ for review.

79) Draft 60 Design Design, Fate and Transport Modeling Results and Summary Report, EDF-275, Section 2.1, Modeling Approach, Page 2-1, Paragraph 2

The reference to the evaluation of vadose zone model codes in Mann, 1999 and the selection of the STOMP code is misleading. The reference cited is a code selection criteria document only and contains no information regarding the relative merits of the STOMP code in meeting these criteria or if other codes performed as well. The actual scoring information is proprietary and unavailable. The use of the STOMP code in the cited Hanford application has not been released to the public. It is suggested that these sentences be deleted from this paragraph.

While the references to the STOMP Theory and User's Guides are useful (since the code was not subjected to any code selection process for the ICDF application as was done at Hanford) additional reference should be made to the STOMP Application Guide (Nichols et al, 1997). This document provides a significant amount of information regarding code validation.

80) Draft 60 Percent Design, Fate and Transport Modeling Results and Summary Report, EDF-275, Section 2.1, Modeling Approach, Page 2-5

While the input parameters and grid used in the model simulations are described in varying degrees of detail, the IDEQ requests that the STOMP input files be provided for evaluation.

81) Draft 60 Percent Design, EDF-275, Fate and Transport Modeling Results and Summary Report, Section 2.1, Modeling Approach, Page 2-6. Last Paragraph

Reference is made to curve-fitting of moisture content-pressure relationships in Figure 2-21 in Schafer et al (1997) as the basis of SRPA and vadose zone basalt hydraulic parameters. The success of the curve-fitting exercise should be shown with a figure.

82) Draft 60 Percent Design, EDF-275, Fate and Transport Modeling Results and Summary Report, Section 2.1, Modeling Approach, Section 2.1, Page 2-6, Last Paragraph

This sentence states that Table 2-2 presents an explanation of changes from the previous model. However, Table 2-2 does not include any such explanations. Please add this information to Table 2-2. This table should be expanded to show a comparison of soil and hydraulic parameters between current and previous modeling. All of the changes noted as footnotes in the table should be expanded on in the text and a rationale provided.

83) Draft 60 Percent Design, EDF-275, Fate and Transport Modeling Results and Summary Report, Section 2.1, Modeling Approach, Table 2-3

a) Please provide a justification for the dispersivity values selected for the media in Table 2-3. The values for the vadose zone layers seem high and intuitively would not be expected to be the same across the media types included. For the saturated zone, considering the short scale of groundwater transport involved (170 m), the SRPA basalt value also seems high.

b) It is unclear whether any investigation of the numerical dispersion introduced by the STOMP code itself been performed. This be evaluated to avoid adding unrealistic amounts of additional dispersion.

84) Draft 60 Percent Design, Evaporation Pond Lining Equivalency Analysis, EDF/ER-312, General Comment

The IDEQ has reviewed this engineering design file, and the alternate design to the requirements stated in 40 CFR 264.221 (c), in accordance with the provisions of 40 CFR 264.221 (d) and practices of other surface impoundments operating in the State of Idaho. On the basis of this review, the IDEQ is not approving the proposed design for the following reasons:

a) The proposed design, which lacks adequate confining pressure over the GCLs in places (i.e., side slopes or when maintenance requires the ponds to be emptied), is subject to differential swelling. Differential swelling could result from: (1) absorption of moisture from the underlying subgrade soils, or (2) liner defects or punctures that allow ponded water to enter the GCLs from above (with zero effective stress at defect locations, the bentonite will swell in the vicinity of the defect). Over the design life, this uncontrolled swelling could compromise the integrity of the liner.

b) The design does not include adequate frost protection for the GCLs. The EDF cites laboratory and field test data which suggest that GCLs do not undergo increases in hydraulic conductivity as a result of freeze-thaw conditions. However, these studies are based on relatively few freeze-thaw cycles. The WorldIndex cold-weather database, produced by the US Army Corps of Engineers, indicates that Idaho Falls undergoes 158 (mean) freeze-thaw cycles per year. Further, the INEEL is typically five to ten degrees colder than Idaho Falls during the winter. Therefore, the GCL portion of the liner could be subjected to thousands of freeze-thaw cycles over the service life of the impoundment. Consequently, there is insufficient data to conclude that the GCL would out perform the originally proposed admixture and/or to eliminate the CCL. Further, an acceptable design must provide adequate frost cover to protect GCLs at the pond bottoms and side slopes.

c) The long term durability of the proposed GCL under INEEL's climatic conditions, especially given hydration concerns discussed above, is unknown. If the GCL were to fail, the reduced attenuative capacity of this liner alone could result in unacceptable risk. While the CCL admixture may suffer some deterioration due to freeze-thaw, the additional attenuative capacity in the three foot CCL layer might overcome this concern.

d) The proposed HDPE top liner will be exposed to temperatures ranging from –40 degrees F to +140 degrees F. Compared to many liner materials, HDPE has a relatively large coefficient of expansion and contraction. Although polyethylene materials are well suited for burial and temperature-stable environment, the proposed HDPE top liner would be exposed and thus undergo large cyclic strains. Consequently, other materials should be considered for evaluation as a top liner.

Given the long-lived nature of some of the contaminants that will be discharged to the pond, and the fact that the ICDF will be built over a sole source aquifer, the IDEQ believes it necessary to weigh protection of the environment more heavily than waste reduction, ease of construction, and a relative cost savings of $80,000. Therefore, redundancy of both system design and quality control is recommended. The Agencies should discuss other design and construction options that could improve the protectiveness of the evaporation ponds.

85) Draft 60 Percent Design, Evaporation Pond Lining Equivalency Analysis, EDF/ER-312, Purpose and Scope, Section 1.1, Page 1

Please provide Figure 1-1.

86) Draft 60 Percent Design, Evaporation Pond Lining Equivalency Analysis, EDF/ER-312, Regulations for Equivalency, Section 1.2, Page 2

The citation 40 CFR 262.221 (c) is incorrect and should be 264.221 (c).

87) Draft 60 Percent Design, Evaporation Pond Lining Equivalency Analysis, EDF/ER-312, Primary Lining System, Hydraulic Criteria, Section 2.2.1, Page 6

Please provide Figure 2-1.

88) Draft 60 Percent Design, Evaporation Pond Lining Equivalency Analysis, EDF/ER-312, Primary Lining System, Leakage Rate, Section 2.2.1.1, Page 8

Please provide a description of how compliance with 40 CFR 264.222 will be met and provide the anticipated Action Leakage Rates for the evaporation ponds. (Giroud and Bonaparte discuss that "flow of liquids through geomembranes is not governed by Darcy's Law" - yet ALRs in EPA regulations assume Darcy's Law).

89) Draft 60 Percent Design, DOE/ID-10851,Construction Quality Assurance Plan for Phase II Construction, Section I-General, Part 2.2.3, Page I-8, First Paragraph, second sentence

This sentence states that "At a minimum the weekly progress shall be attended.....". It appears that "weekly" was used inadvertently instead of "bi-weekly". Please clarify.

90) ICDF 60 Percent Design, DOE/ID-10851,Construction Quality Assurance Plan for Phase II Construction, Section II-Soils Construction Quality Assurance, Table 2-3, Page II-17, Note 3

This sentence states that *"The frequency of pre-compaction tests have been doubled assuming that bentonite mixing will be performed by earth-moving equipment."*. Please clarify what is meant by "*earth moving equipment*", and if this equipment differs from that used for test pad construction.

91) Draft 60 Percent Design, DOE/ID 10851, ICDF Construction Quality Assurance Plan for Phase 2, Section 2.2.2.2, Page III-4, Second Paragraph.

Please describe how previously-deployed panels will be protected after installation (and acceptance) from inclement weather events.

92) Draft 60 Percent Design, DOE/ID 10851, ICDF Construction Quality Assurance Plan for Phase 2, Section 2.3.2.2, Page III-4, Paragraph.

Please state the minimum overlap required for damaged GCL material repair.

93) Draft 60 Percent, DOE/ID 10851, ICDF Construction Quality Assurance Plan for Phase 2, Section VIII, Subsection 1.8, Page VIII-5.

Please include a Section that describes the Storage of (archived) Construction Samples.

94) Draft 60 Percent Design, NESHAP Modeling, EDF-ER-290, General Comments

a) This EDF carefully describes the radiological data input to the model but does not adequately describe the other model parameters. The model inputs including but not limited to the following: receptor array, meteorological data, source terms (area or point), and emission rates of the contaminants of concern should be more fully described and justified in the EDF.

b) The EDF must be revised to ensure continued compliance with the NESHAP and other air quality standards whenever the isotopic concentrations in the waste received exceed predicted levels (either by concentration or contaminant).

c) The EDF must re-evaluate the combined emissions associated with the surface impoundment and landfill. The evaluation should correctly locate each unit and model the landfill and surface impoundments as area sources. Should the actual source term differ from what is presented in this EDF, the model must be re-run. If the recalculated

dose to the MEI *could* exceed one percent of the NESHAPS standard, monitoring is required in accordance with 40 CFR 61 Subpart H. Further, exceeding the 0.1 millirem dose to the MEI would trigger State of Idaho Potential for Significant Deterioration (PSD) requirements on the INEEL. The ICDF operations would not be impacted by such an event, but all future INEEL air permitting and remedial actions with air concerns would be impacted. INEEL would be required to implement best available control technologies (BACT) for all new or modified units on the site.

d) The September 24 e-mail string from Chris Staley to Martin Doornbos to the IDEQ suggests the generic INTEC location was used to model the ICDF surface impoundments and landfill. In previous modeling efforts the generic INTEC location has been the main stack. The main stack is located over 800 meters northeast of the proposed ICDF location. The CAP88 model needs to be rerun using separate, properly located area source terms for the landfill and surface impoundments. The location of the Maximally Exposed Individual (MEI) needs to be recalculated based on the corrected plots and revised model runs.

e) The document must justify why the MEI is located at the point indicated. It appears that data from a previous modeling run was used to set the model boundary at 13,900 meters. The model boundary should extend an additional distance to demonstrate the MEI is correctly located. Further, the on-site risk to the public at EBR-1, the rest area along Highway 20-26 and other select points along the highway should be evaluated to ensure that the ICDF operations do not pose an unacceptable risk to the public.

f) The IDEQ suggests that the model should evaluate on-site radionuclide deposition to ensure impacted soils do not exceed established action levels.

g) The EDF should evaluate the emissions associated with all activities associated with the ICDF Complex including transportation, treatment and disposal in the ICDF landfill.

95) Draft 60 Percent Design, EDF-ER-290, NESHAP Modeling, Page 9 and Figure 1.

The conclusions report the MEI is located on the INEEL property line 13,900 meters from the ICDF units. The map scale is presented in miles only (no metric scale) and the triangle locating the MEI is located at least 1 mile south of the INEEL property line. The map should present both a metric and English scale and the location of the MEI should be accurately plotted.

96) Draft 60 Percent Design, EDF-ER-290, NESHAP Modeling, Figure 1, Page 10.

The ICDF appears to be incorrectly plotted southeast (and east of the rail line) of INTEC rather than southwest of the INTEC fence line.

97) Draft 60 Percent Design, EDF-ER-290, NESHAP Modeling, Chapter 4,Evaporation Pond Source Terms, Page 11.

On the basis of the NESHAPs modeling, only leachate and well water as described on page 2 of EDF 290 are approved for discharge to the impoundment.

98) Draft 60 Percent Design, EDF-ER-322, Waste Placement Mapping Plan, Acronyms, Page vii.

The acronym *"IWTS"* is defined in this list as *"INEEL Waste Tracking System"* and on page 5 as *"Integrated Waste Tracking System."* We suggest that the text be revised for consistency.

99) Draft 60 Percent Design, EDF-ER-322, Waste Placement Mapping Plan, Section 1.2.1, Page 1, First Paragraph under Section Heading, Items 1 and 2.

The referenced text appears to address only the disposal of bulk soil waste loads. Please add language that targets boxes of encapsulated and treated debris.

100) Draft 60 Percent Design, Waste Placement Mapping Plan, EDF/ER-322, Track Each Waste Load, Section 1.2.1, Page 1, Second Paragraph under Section Heading

Please note that besides public perception it is a regulatory requirement that DOE knows exactly where each load of waste was placed. Also, the IDEQ inspections will be completed to ensure DOE compliance with 40 CFR 264.309.

101) Draft 60 Percent Design, EDF-ER-322, Waste Placement Mapping Plan, Section 1.2.1, Page 1, Last Paragraph on Page

This "disadvantage" could be easily overcome by mounting of the GPS unit on the ICDF landfill dozer. So doing would minimize exposure and eliminate the need for additional personnel to track the coordinates.

102) Draft 60 Percent Design, EDF-ER-323, Evaporation Pond Berm Overtopping Analysis, General Comment

Please confirm that the 2-foot free board is measured from the horizontal top of the pond berm vertically down to the liquid surface.

Reference Cited

Selker, John S., C. K. Keller and J. T. McChord, 1999; Lewis Publishers (CRC Press LLC), 339 p.